DOCUMENT RESUME

ED 243 529 JC 840 202

AUTHOR Coffey, Janis Cox
TITLE RETNA: Regional Employment and Training Needs Assessment Project.
INSTITUTION Los Rios Community Coll. District, Sacramento, Calif.
PUB DATE Jan 84
NOTE 52p.
PUB TYPE Reports - Descriptive (141) -- Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Community Surveys; Computer Oriented Programs; *Databases; Educational Needs; Employer Attitudes; *Employment Opportunities; *Employment Projections; Job Skills; Job Training; *Labor Needs; *Needs Assessment; *Occupational Information; Occupational Surveys; Questionnaires; School Business Relationship

ABSTRACT

The Regional Employment and Training Needs Assessment (RETNA) project was organized to determine both current and projected employment and training needs in specific industries and occupations in the Sacramento area. The project involves the development of a prototypical computerized database developed from survey research on employment needs and job skills requirements. The first surveys conducted as part of the RETNA project were sent in September and October 1983 to selected employers in the area as well as to firms planning to locate near Sacramento. These surveys solicited detailed information about the basic skills, education, and specific technical skills needed in two occupations in the computer industry and two in the electronics industry. The information in the RETNA database is intended to be used by area education and training organizations in the development and upgrading of vocational programs. This report provides information on: (1) the need for RETNA; (2) survey research methodology and design, including a discussion of survey development, selection of employers to be surveyed, and response rates; (3) the components of the RETNA database; (4) initial results of a general employer survey and the four occupation-specific surveys; and (5) next steps in RETNA development. Appendices include the surveys, a technical summary of the RETNA project's interactive computer prototype and its operating environment, and a list of RETNA advisory committee members. (HB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED243529

RETNA:

Regional Employment and Training Needs Assessment Project

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

J. C. Coffey

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Janis Cox Coffey
Director of Planning and Research
January, 1984

Los Rios Community College District
1919 Spanos Court, Sacramento, CA 95825

JC 840 202

RETNA:

Regional Employment and Training

Needs Assessment Project

Janis Cox Coffey
Director of Planning and Research
Los Rios Community College District

January 1984

Acknowledgments

Studies are rarely the work of one individual alone and the RETNA project is no exception. The idea for RETNA was the result of many hours of discussion with business and industry leaders in the Sacramento area who shared with those of us in the educational community a concern that better local labor market information be developed. The members of the advisory committee to the RETNA project -- all members of the Los Rios District staff -- worked in turn with campus faculty and vocational advisory committees to design the various occupational surveys used in the project. Their help was invaluable.

Perhaps most important were the contributions of Randall Jones, Senior Systems Programmer for the Los Rios District, who turned the ideas and survey research data into the series of interactive computer programs that are the heart of the RETNA project.

Janis Cox Coffey
Director of Planning and Research
Los Rios Community College District

January, 1984

Table of Contents

BACKGROUND: THE NEED FOR RETNA 1

RETNA AT A GLANCE 2

METHODOLOGY: SURVEY RESEARCH DESIGN 4

- Survey Development 4
- Selection of Employers 5
- Response Rates 6

THE RETNA DATA BASE 6

INITIAL RETNA RESULTS 9

- General Employer Survey 9
- Computer Programmer 12
- Computer Operator 16
- Electronics Technician 18
- Electronics Mechanic 21

NEXT STEPS IN RETNA DEVELOPMENT 23

APPENDICES

A) RETNA Description, Employer Letter, Surveys
B) RETNA Computer Program Technical Summary
C) Advisory Committee

RETNA:

REGIONAL EMPLOYMENT AND TRAINING

NEEDS ASSESSMENT PROJECT

BACKGROUND: THE NEED FOR RETNA

The idea for the Regional Employment and Training Needs Assessment (RETNA) project evolved from a series of meetings between education and business leaders in the Sacramento region in late 1982. The impetus for the meetings was the growing awareness of the need for better linkages between the education, business and government sectors to meet the education and training needs of an increasingly technological society. Cooperation between the public and private sectors was viewed as the key to meeting the challenge of providing relevant and effective training to the area's existing potential work force.

The need for a new business/industry/education linkage was being discussed widely in California and was underscored be Governor Brown in his January 1982 "State of the State" address. In it Governor Brown unveiled his new "Investment in People" program, which had as one major goal the improvement and expansion of vocational education for California's new high technology jobs through job-based vocational training as a cooperative effort of the community colleges, business, and government. Statewide, some $11 million was allocated to community colleges to fund programs in high and emerging technologies, worksite-based training, and retraining of displaced workers (CPEC, Director's Report, January 1983, pp. 17-21). Beyond the Governor's new initiative, of the estimated $720 million in federal and state funds spent in California annually on employment training for adults, nearly $562 million was allocated to vocational education in the community colleges (A Working Partnership for 1993: Conference Summary, June 1983, p. 1). In addition, the new Job Training Partnership Act (JTPA) was set to allocate almost $400 million statewide to vocational training through the local private industry councils. Clearly, the reasons for business and education to cooperate had never been greater. Yet discussions between business and education leaders often revealed a mismatch between what business wanted its employees to know and what vocational training programs were providing. Across the state, the need was being articulated for a better match between the current and projected training needs of employers and the publicly-funded vocational training programs.

The discussions between business and education leaders in Sacramento revealed a similar discrepancy between the current information on the local labor market, the needs of specific employers, and the vocational training programs of the area's numerous education and training providers. In addition, the Sacramento region was experiencing a notable shift in its economic and employment base.

Sacramento is expected to be the second fastest-growing area in the state, according to projections done by the Palo Alto Center for Continuing Study of the California Economy. While the Sacramento region is still heavily dominated be government employment (some 35 percent of the area's work force), growth in

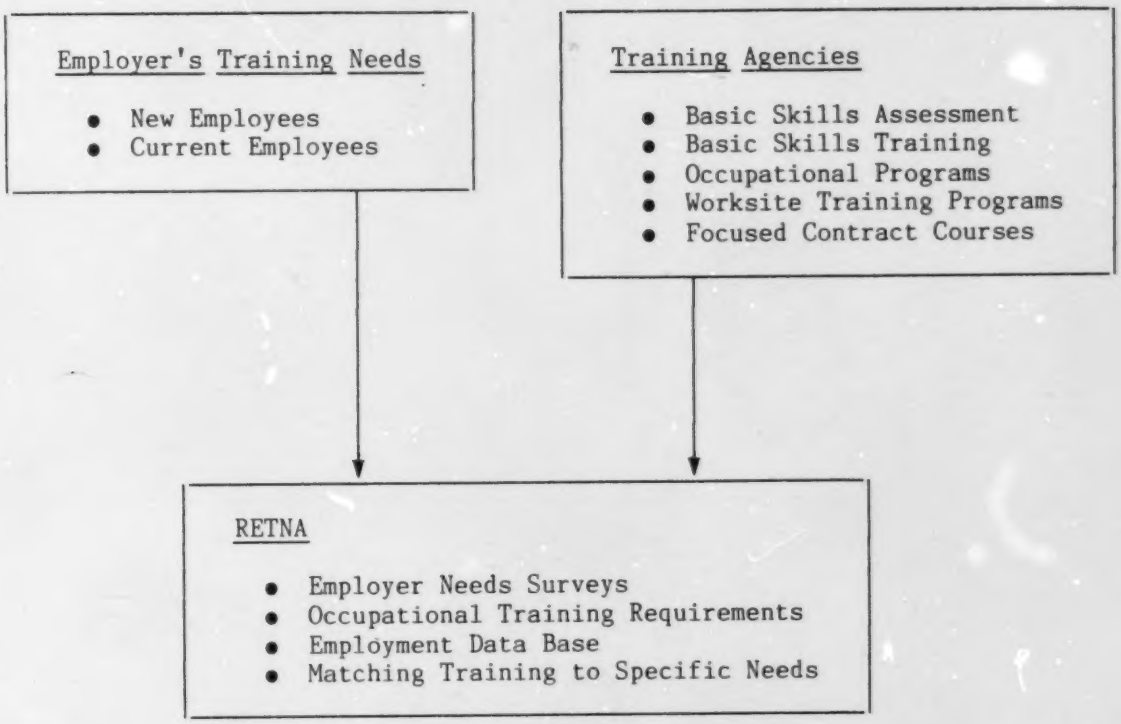
that sector has slowed considerably. In its stead has come growth in the high-technology and information management sectors, with high-technology firms expected to generate nearly 20,000 new jobs in the Sacramento region by 1991 (Sacramento Bee, July 25, 1983). In the 1982/83 fiscal year alone, some 15 new new high-technology, light industrial and manufacturing firms located in the Sacramento region. Due to its positive economic climate, low housing costs, and plentiful land, water, power and transportation, the Sacramento region is expected to increase its rate of growth and economic development well into the 1990s and beyond. With organizations like the Sacramento Area Commerce and Trade Organization (SACTO) and the Chamber of Commerce promoting the location of high technology and light industrial firms in the region, the necessity of having a new mechanism for assessing employment and training needs and capabilities was underscored. RETNA was developed to provide the vital linkage among employers, training agencies, qualified workers and available and potential jobs in the Sacramento region.

RETNA AT A GLANCE

The RETNA project was organized to determine both current and projected employment and training needs in specific industries and occupations. The project involves the development of a prototypical computerized data base developed from survey research on employer needs and job skills requirements. The first surveys -- covering two occupations in the computer industry and two in the electronics industry -- were sent in September and October 1983 to selected employers in the four-county Sacramento region as well as to several firms planning to locate in the area. The information in the data base is unique in that it asks detailed questions about the basic skills, education, and specific technical skills needed in each occupation. The information is intended to be shared and used among area education and training organizations to: (1) develop training programs to meet the specific needs of individual employers through such means as on-site training or contract courses; (2) upgrade current vocational programs; and (3) identify areas in which new programs are needed. Figure 1 illustrates the RETNA linkages.

Figure 1

RETNA Linkages



METHODOLOGY: SURVEY RESEARCH DESIGN

The RETNA model is based on two principal components: survey research and an interactive, computerized data base. The development of the general employer survey and specific occupational surveys was the first task undertaken in the project.

Survey Development

Survey development was the responsibility of a committee composed of vocational education representatives from the district's three colleges, the district director of planning and research, a faculty research associate, and representatives from the Employment Development Department's Employment Data and Research Division. The initial task for the committee was a review of the current literature and research to determine whether sample surveys and data bases had already been developed that would meet RETNA's needs.

The review of the literature and the ERIC data base uncovered a number of research documents that included sample employer surveys done by colleges. However, when checked in detail, only six research projects really included the types of surveys intended for the RETNA model. These were:

- Ohio Board of Regents, Office of Two-Year Campuses, "A Survey of Organizational Training and Education Programs"; 1981.
- Marlette, Julianne M., "Facilitating Economic Development Through Linkages Between Vocational Education, CETA and Small Businesses: Final Report"; Wisconsin Vocational Technical and Adult Education District 1; 1981.
- Ferguson, L. G., et. al, "Assessment of Business and Industry Needs: Phase II of Multi-County Assessment of Adult Needs Project"; McLennan Community College, Texas; 1975.
- Mehallis, Mantha Vlahos, "Broward County Employer Training Needs Assessment"; Broward Community College, Ft. Lauderdale, Florida; 1978.
- Johnson County Community College, Kansas, "Educational Needs of Johnson County Businesses"; 1978.
- Alvarado, Andrew and Shaver, Jon, "The Unmet Educational Needs of Full-Time Employees: a Phase II Assessment for New Dimensions"; Los Angeles Community College District, California; 1977.

With the research documents and sample surveys in hand, the RETNA committee produced a draft general employer survey. In addition, the committee discussed the various occupations that might be surveyed and decided on two in the computer industry and two in the electronics industry. The choice of these industries was largely based on discussions with the Employment Development Department staff regarding potential growth occupations in the Sacramento region and the data the campus representatives had regarding the explosive

demand for electronics and computer training at the colleges. The draft surveys for each of the four occupations -- Computer Programmer, Computer Operator, Electronics Mechanic, and Electronics Technician -- were developed by committee members working with campus vocational staff and representatives of several local electronics and computer businesses.

Once the draft surveys were developed, they were pilot tested by two of Sacramento's largest employers -- McClellan Air Force Base (with some 13,000 employees) and Computer Sciences Corporation (over 900 employees). The comments and suggestions provided by the employers resulted in several alterations in the surveys to make them more specific in terms of the technical skills required in each of the occupations. In addition, the "Dear Employer" letter used with the surveys was reviewed by the pilot test employers and a final version produced. (The five surveys and the employer letter appear in Appendix A.)

Selection of Employers

While the surveys were being developed, the committee worked with representatives of the Employment Development Department to produce a list of employers to be surveyed. The initial intent was to have EDD generate a list of those employers most likely to have employees in each of the four occupational areas, and to select the employers by size, geographic area (the Sacramento region includes four counties), and type of industry. Unfortunately, the EDD employer data base does not include state and federal offices, a serious limitation in a region so dominated by government employment. Using SIC (Standard Industrial Classification) codes, size of employer, and estimates from its occupational surveys (last done in 1978/79), EDD produced a list of employers to survey. Upon review by the committee, however, it became apparent that the list was of questionable value: many discrepancies in the types of employers listed and the exclusion of some of the region's major computer and electronic firms caused serious questions to be raised about the accuracy of the EDD data base in terms of its usefulness for selecting specific employers to be surveyed in a local region. After discussions with the EDD staff, some of the problems of the data base appeared insoluble. The occupational surveys were last done by the EDD in 1978 and 1979 and simply could not reflect the dramatic increases in employers using computer and electronics employees. In addition, the federal census data used in the EDD data base was the 1970- and 1975-updated census information, since the 1980 census data was not yet available to EDD in a compatible format. These problems meant that the RETNA committee was faced with a dilemma: having the surveys ready to be sent out and having no list of employers to receive them.

The solution was finally to generate our own list, using a private firm that specialized in mailing lists and labels. Choosing industry (SIC) codes that the committee felt reflected the types of firms that might employ electronics and computer personnel, a list of some 1400 employers in the four-county Sacramento region was produced. The list included all employers within a particular industry code, and did not discriminate on the basis of employer size, which proved to be a significant problem.

Response Rates

The surveys were mailed to employers in September and October 1983. For the larger firms, a specific letter was sent to the chief executive officer (by name) explaining RETNA and encouraging response to the survey. While this letter was essentially the same as the "Dear Employer" letter, the personal contact with the company president and follow-up phone calls resulted in an excellent return from the region's larger employers. Unfortunately, due to the very large numbers of one and two-person firms on the employer list, the overall rate of return for the total number of surveys sent out was only about 10%. Given this experience, the RETNA surveys in the future will be sent primarily to the larger firms in each specific industry, both because these larger firms likely set and reflect industry trends and because the response rate from the many small businesses was so low.

Given that the majority of Sacramento's larger employers in the computer and electronics industries did complete and return the initial RETNA surveys, the data base for these surveys is probably quite valid and reflective of the specific training needs in the four occupational areas.

THE RETNA DATA BASE

The initial design of the RETNA model included development of a computerized data base that was highly interactive ("user friendly" in computer terms) and easily updated. In addition, the RETNA model was intended to be able to run on a relatively inexpensive microcomputer to enable as many training providers as possible to use RETNA easily and at low cost.

To accomplish this, RETNA has been programmed to run on an Apple II Plus modified to run the CP/M operating system. For data base management, we chose dBASE II, a powerful program/command language that permits easy creation, display, and editing of a data base. While the RETNA data base and programs as presently developed take three floppy disk drives, the fully developed version of RETNA will ultimately require either additional floppy disk drives or, preferably, a single hard disk drive.

The RETNA data base has two major components: (1) an employer profile and (2) an occupational profile. The employer profile is accessed by employer code and includes the following information:

- Employer name
- Major product or service
- Number of employees by category (i.e., management, sales and marketing, production, clerical, etc.)
- Projected new hires by category
- Recruitment sources used
- Whether employer has a training program and/or would be interested in developing one
- Areas in which employer would like training programs
- Best site and times for training
- Whether training should be for college credit or certificate of completion

- Types of incentives employer could offer for employees to take further training

Aggregate information for all employers, including total responses and percentages is also available. As each screen of information appears, the user can elect to print and thus retain that information on paper. The employer profile also includes each employer's responses to the specific occupational surveys.

The occupational profile is accessed by occupational code and includes the following aggregated information:

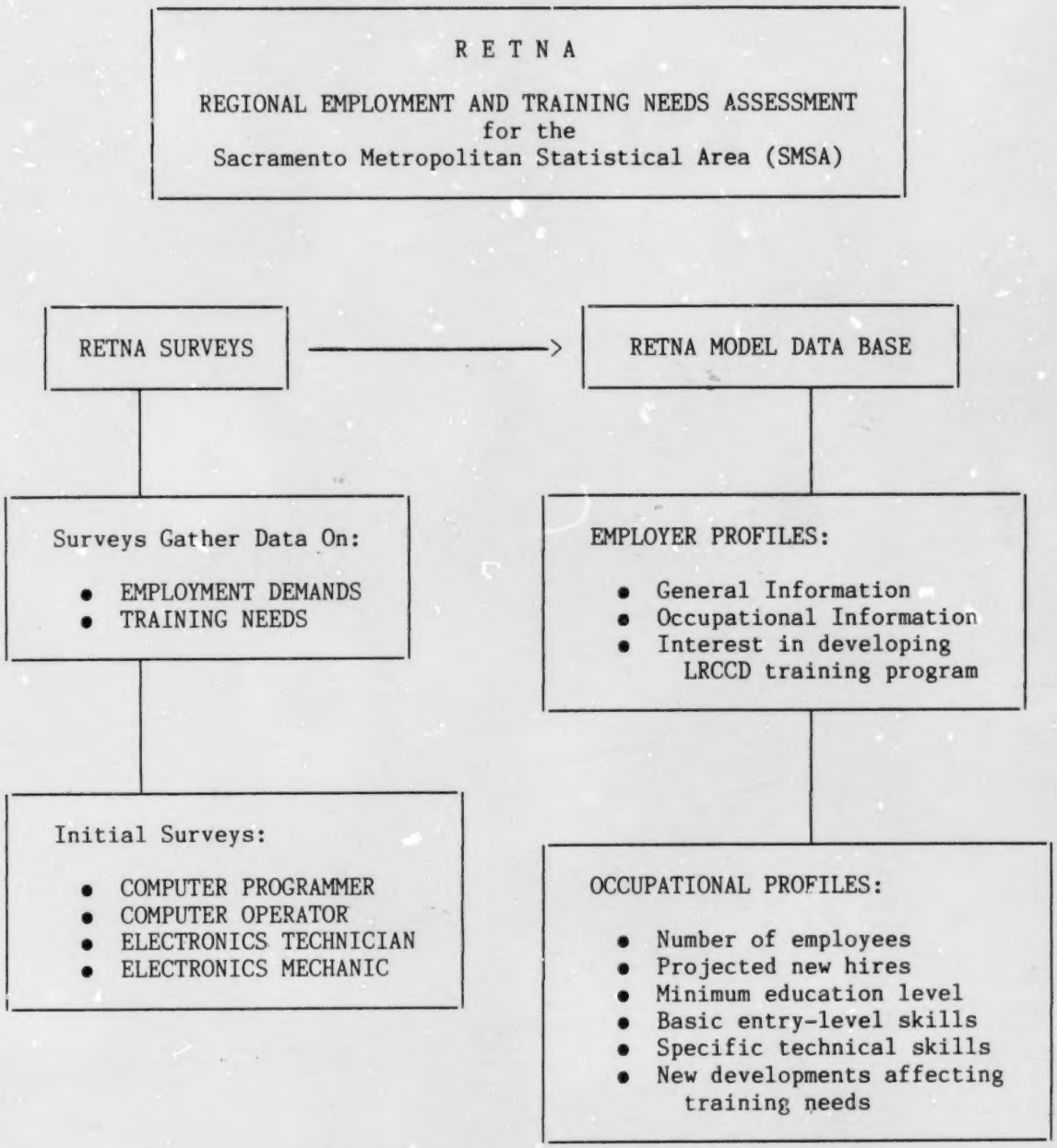
- Number of employees in Sacramento region in each occupation (according to survey results)
- Projected number of new hires for next two years
- Minimum educational level required
- Basic entry-level skills required
- Specific technical skills required
- New developments affecting training needs
- A list of employers that answered the occupational surveys

As with the employer information, the user can elect to print the information on each screen and retain a paper copy of it. Once the information from the general survey for that employer is completed, the user can decide whether to view the employer's response to the occupational surveys.

Figure 2 illustrates the RETNA data base and its relation to the survey research component.

In addition to the employer and occupational profiles, RETNA includes a highly interactive set of programs for input of the general employer and occupational information. This allows virtually anyone to enter data from the surveys into the RETNA data base, and to add to or update the data base. A technical manual detailing the operation of RETNA is in development and will be available as part of the RETNA data base software package.

Figure 2


R E T N A
REGIONAL EMPLOYMENT AND TRAINING NEEDS ASSESSMENT
for the
Sacramento Metropolitan Statistical Area (SMSA)
RETNA SURVEYS
RETNA MODEL DATA BASE
Surveys Gather Data On:
• EMPLOYMENT DEMANDS
• TRAINING NEEDS
EMPLOYER PROFILES:
• General Information
• Occupational Information
• Interest in developing LRCCD training program
Initial Surveys:
• COMPUTER PROGRAMMER
• COMPUTER OPERATOR
• ELECTRONICS TECHNICIAN
• ELECTRONICS MECHANIC
OCCUPATIONAL PROFILES:
• Number of employees
• Projected new hires
• Minimum education level
• Basic entry-level skills
• Specific technical skills
• New developments affecting training needs

INITIAL RETNA RESULTS

The initial surveys for the RETNA project included a general employer survey and surveys covering four different occupations in the computer and electronics fields: computer programmer, computer operator, electronics technician, and electronics mechanic. The aggregate responses from the employers that answered each survey are discussed below.

General Employer Survey

The general employer survey was designed to elicit basic information from each employer as to the major product or service, number of employees and projected new hires in various categories (i.e., management/administration, sales/marketing, production, clerical, etc.), recruitment sources used, whether the employer might be interested in working with Los Rios to develop a training program to meet specific needs and if so, in what areas. Virtually all employers responding to the surveys answered the general employer survey, while fewer answered the specific occupational surveys (often because they did not employ persons in the specific occupations). The RETNA computer program gives the responses to this survey by each individual employer and an aggregated summary of all employer responses. The aggregate results from the 113 employers who responded to the general employer survey are as follows.

Each employer was asked to indicate the number of employees in the Sacramento area (as opposed to the number in their entire organization) and to estimate the number of hires anticipated over the next two years due to turnover and to new positions. While some employers did not wish to provide specific numbers, the aggregated current and projected employee counts for those who did respond are shown in the table below.

General Employer Survey - Summary

The RETNA Employer Data files contain information on 113 employers. Shown below are some current and projected employee counts.

		- - - - - Next two years - - - - -	
	Presently Employed	Expected hiring, Turnover	Expected hiring, New Positions
Mgmt/Admin.	3795	408	38
Supervisory	1826	171	30
Sales/Marketing	780	84	101
Technical	2174	182	100
Clerical	3042	342	72
Production	7046	892	229
Other	5626	595	84

Newspaper ads and employee referrals led the list of recruitment sources used, with college or technical school placement offices reportedly used by only 38.9% of the responding employers (see table below).

Tally of Recruitment Sources used by the surveyed companies:

38 (33.6%)	Private Employment Agencies
36 (31.9%)	State Employment Development Department
44 (38.9%)	College or Technical School Placement Offices
71 (62.8%)	Newspaper Advertisements
66 (58.4%)	Employee Referrals
18 (15.9%)	Professional Publications
22 (19.5%)	Other Sources

(Percentages do not sum to 100 since employers could list as many recruitment sources as they wished.)

The majority of respondents indicated they had a training program of some sort, either for all staff or only for new staff. Thirty-eight employers did not have a training program and 30 employers (26.5%) indicated they would be interested in working with the district to design a training program to meet their needs.

Do you currently conduct a training program for employees?

32 (28.3%)	Yes
23 (20.4%)	Yes, for all staff
20 (17.7%)	Yes, but only for new staff
4 (3.5%)	No, but would like to develop one
34 (30.1%)	No

(Percentages do not add to 100 since some employers did not answer this question.)

Sales and marketing and management skills were the areas most frequently listed by employers interested in developing a training program with the district. (Percentages in the table below are low since relatively few employers answered this question.)

Areas of interest for cooperatively developed training programs:

4	3.5%	Basic Ed. Skills	0	0.0%	Opto Electronics
7	6.2%	Business Writing	6	5.3%	Accounting/Finance
0	0.0%	Technical Writing	0	0.0%	Engineering: Tech.
10	8.8%	Oral Communications	7	6.2%	Human Relations
7	6.2%	D.P.: Computer Literacy	14	12.4%	Management Skills
5	4.4%	D.P.: Computer Operations	1	0.9%	Math/Statistics
4	3.5%	Computer Programming	15	13.3%	Sales and Marketing
2	1.8%	Electronics: Production	3	2.7%	Word Processing
4	3.5%	Electronics: Technician	5	4.4%	Secretarial Skills
8	7.1%	Electronics: Repair	7	6.2%	Other
3	2.7%	Electronics: Digital			

When asked about the best times to schedule training, employers indicated a combination of times would be preferable (see below).

Best times to schedule training for your employees:	2 (1.8%)	Morning
	0 (0.0%)	Afternoon
	15 (13.3%)	Evening
	3 (2.7%)	Weekend
	24 (21.2%)	Combination of above

Company-paid tuition was the incentive listed most often by employers for their employees to take further training. The other incentives and percentages of employers listing each are in the table below.

What types of incentives could you offer for employees to take further training?	9 (8.0%)	Release time from work
	18 (15.9%)	"Flextime" schedule
	30 (26.5%)	Company-paid fees
	22 (19.5%)	Possibility of promotion
	4 (3.5%)	Other
	1 (0.9%)	None

Finally, employer respondents indicated a preference for instruction and training at their site, and for that training to be offered for college credit plus a certificate of completion (see tables below).

What is the best site for instruction/training?

23 (20.4%)	At your site
6 (5.3%)	At a site close to your organization
16 (14.2%)	At a college campus

Should instruction/training be offered for:

14 (12.4%)	College credit
16 (14.2%)	Credit plus certificate of completion
11 (9.7%)	Certificate of completion only

Computer Programmer

Thirty-five employers answered the computer programmer survey, including such organizations as Hewlett-Packard, Aerojet, McClellan, Computer Sciences Corporation, Sierratronics, Burroughs, NCR Corporation, County of Sacramento, and the San Juan Unified School District. The employers answering the survey reported 477 currently employed computer programmers, with 251 positions projected to open in the next two years. Only 2 employers reported having formal training programs, although 14 reported having upward mobility programs available for the next level of occupation in this field.

The minimum education level most often required for computer programmer was the baccalaureate degree (37.1%), with 20% citing "technical training beyond high school," and 17.1% citing two-year college (AA/AS) degrees. The precise number of responses and percentages are given below.

Minimum education required:

4 (11.4%)	High School Diploma
7 (20.0%)	Technical training beyond High School
6 (17.1%)	Two-year college (AA/AS) degree
13 (37.1%)	Baccalaureate (BA/BS) degree
2 (5.7%)	Masters (MA/MS) degree
1 (2.9%)	Other

(Percentages may not add to 100 since some employers did not answer this question.)

The level of basic skills needed by employees in this occupation was consistent with the educational level required: the majority of employers cited college-level reading and writing and statistics as the basic skills needed by an employee for entry into computer programming. The table below provides specific numbers and percentages.

Basic skills needed by an employee entering this occupation:

Reading:	High School level	6	(17.1%)
	College level	26	(74.3%)
Writing:	High School level	7	(20.0%)
	College level	24	(68.6%)
Mathematics:	Arithmetic	1	(2.9%)
	Algebra	8	(22.9%)
	Advanced Algebra	5	(14.3%)
	Statistics	15	(42.9%)
	Other	2	(5.7%)
	Other basic skills	5	(14.3%)

(Percentages may not add to 100 since some employers did not answer this question.)

Employers reported that while their computer programmers were generally adequately prepared, the areas of management/supervision, technical writing, and human relations were listed as the weakest.

Are the present employees adequately prepared in the following skills?

	- - YES - -		- - NO - -	
Reading	28	80.0%	2	5.7%
Business Writing	23	65.7%	7	20.0%
Technical Writing	21	60.0%	10	28.6%
Oral Communications	27	77.1%	3	8.6%
Mathematics	29	82.9%	2	5.7%
Technical Skills	26	74.3%	5	14.3%
Management/Supervision	19	54.3%	11	31.4%
Human Relations	22	62.9%	8	22.9%

(Percentages may not add to 100 since some employers did not answer this question.)

The majority of the respondents reported that BASIC and COBOL were the most frequently required languages that programmers should know; numbers and percentages for the various languages are given in the table below.

Programming languages that should be known by Computer Programmers:

BASIC	23 (65.7%)	COBOL	20 (57.1%)	FORTRAN	16 (45.7%)
RPG	13 (37.1%)	Assembly	15 (42.9%)	Pascal	10 (28.6%)
PL1	1 (2.9%)	Ada	1 (2.9%)	Other	8 (22.9%)

(Percentages may not add to 100 since employers could list more than one language.)

Minicomputers were the type of computer most frequently in use (by 62.9% of all respondents) and tied with microcomputers as the type most frequently planned for acquisition (see below).

Computer Systems in use of planned for acquisition:

	Mainframe	Minicomputer	Microcomputer
In Use -	14 (40.0%)	22 (62.9%)	20 (57.1%)
Planned -	3 (8.6%)	11 (31.4%)	11 (31.4%)

(Percentages may not add to 100 since employers could list more than one type of computer system.)

Knowledge of arithmetic operations led the list of skills required of computer programmers, although a number of skills ranked very highly (see table below).

The following skills were required of Computer Programmers:

23	(65.7%)	Flowcharting
25	(71.4%)	I/O Operations
28	(80.0%)	Arithmetic Operations
26	(74.3%)	Editing
25	(71.4%)	Tape/Disk Operations
23	(65.7%)	Table Handling
27	(77.1%)	File Access
27	(77.1%)	File Design/Organization
21	(60.0%)	System Flowcharting
24	(68.6%)	Systems Analysis
8	(22.9%)	Other skills

(Percentages do not sum to 100 since employers could list as many skills as they wished.)

In addition to specific skills, knowledge of the following systems/processes was required of programmers:

The following systems/processes should be known by Computer Programmers:

20	(57.1%)	Batch/Time-sharing Systems
25	(71.4%)	Data Communication Systems
26	(74.3%)	Documentation
12	(34.3%)	Graphics
28	(80.0%)	Program Debugging Techniques
21	(60.0%)	Data Base Management
26	(74.3%)	File Management
17	(48.6%)	Structured "Walk-thrus"
27	(77.1%)	Program Testing Techniques
1	(2.9%)	Others

(Percentages do not sum to 100 since employers could list as many systems/processes as they wished.)

Eight employers (22.9% of the respondents) reported they anticipate new developments that will affect the training needed by computer programmers. An equal number indicated they would be interested in developing a cooperative training program with the district for this occupation. Of those employers interested in developing a program, 37.5% indicated a willingness to provide facilities or equipment, and half said they were willing to provide personnel.

Computer Operator

Thirty-three employers answered the computer operator survey, including firms such as Aerojet, Data General, Sierratronics, McClellan, Computer Sciences Corporation, El Dorado Savings and Loan, KVIE-TV, and Trendata Corporation. Those employers answering the survey reported employing 217 computer operators, with 67 positions projected to open in the next two years. Only 3 employers reported having formal training programs for this occupation, while 17 (51.5% of those responding) reported having an upward mobility program for those who are already computer operators.

The minimum education level required of computer operators was most often reported to be technical training beyond high school, although a considerable percentage required only a high school diploma (see table below).

Minimum education required:

9 (27.3%)	High School Diploma
14 (42.4%)	Technical training beyond High School
3 (9.1%)	Two-year college (AA/AS) degree
3 (9.1%)	Baccalaureate (BA/BS) degree
0 (0.0%)	Masters (MA/MS) degree
2 (6.1%)	Other

(Percentages do not add to 100 since some employers did not answer this question.)

The level of basic skills required of computer operators was generally consistent with the minimum educational level required: high school level reading, writing, and arithmetic, although 21.2% of the employers also wanted statistics as the table below indicates.

Basic skills needed by an employee entering this occupation:

Reading:	High School level	20	(60.6%)
	College level	9	(27.3%)
Writing:	High School level	20	(60.6%)
	College level	8	(24.2%)
Mathematics:	Arithmetic	13	(39.4%)
	Algebra	5	(15.2%)
	Advanced Algebra	3	(9.1%)
	Statistics	7	(21.2%)
	Other	0	(0.0%)
	Other basic skills	7	(21.2%)

(Percentages do not sum to 100 since some employers did not answer this question.)

While most employers felt their computer operators were adequately prepared in the skills listed below, technical writing, business writing, and management/supervision were cited as the weakest areas.

Are the present employees adequately prepared in the following skills?

	- - YES - -		- - NO - -	
Reading	27	81.8%	2	6.1%
Business Writing	20	60.6%	9	27.3%
Technical Writing	16	48.5%	11	33.3%
Oral Communications	25	75.8%	4	12.1%
Mathematics	26	78.8%	3	9.1%
Technical Skills	22	66.7%	7	21.2%
Management/Supervision	16	48.5%	9	27.3%
Human Relations	20	60.6%	5	15.2%

(Percentages may not sum to 100 since some employers did not respond to this question.)

The specific skills most frequently required of computer operators are listed in the table below.

The following skills were required of Computer Operators:

26	(78.8%)	Basic Terminology
20	(60.6%)	Knowledge of Storage Media/Devices
15	(45.5%)	Data Collection/Transmission Procedures
14	(42.4%)	I/O Techniques
23	(69.7%)	Computer Operations
6	(18.2%)	Programming Techniques
3	(9.1%)	Other Skills

(Percentages do not sum to 100 since employers could list as many skills as they wished.)

In addition to the specific technical skills required by computer operators, employers indicated that data communication systems and batch/time-sharing systems were the most important systems/processes for employees in this occupation to know (see table below).

The following systems/processes should be known by Computer Operators:

16	(48.5%)	Batch/Time-sharing Systems
18	(54.5%)	Data Communication Systems
14	(42.4%)	Documentation
8	(24.2%)	Graphics
6	(18.2%)	Program Debugging Techniques
11	(33.3%)	Data Base Management
12	(36.4%)	File Management
4	(12.1%)	Structured "Walk-thrus"
8	(24.2%)	Program Testing Techniques
2	(6.1%)	Others

(Percentages do not sum to 100 since employers could list as many systems/processes as they wished.)

Four of the employers responding to this survey anticipated new developments that could affect the training needed by computer operators. Six employers indicated an interest in developing a cooperative training program with the district and of those, half indicated a willingness to provide facilities and one-third tc provide either equipment or personnel for such a program.

Electronics Technician

Thirty-three employers answered the electronics technician survey, including Hewlett-Packard, CableData, McClellan, KFBK/KAER Radio, Digital Equipment Corporation, Burroughs, and NCR Corporation. The responding employers reported

466 electronics technicians currently employed, with 108 positions projected to open in the next two years. Three employers stated they have formal training programs for entry into this occupation, and 16 employers reported having upward mobility training programs for those electronics technicians who are already employed.

The minimum educational level required for this occupation was primarily the technical or two-year collegiate level, as the table below indicates.

Minimum education required:

2 (6.3%)	High School Diploma
15 (46.9%)	Technical training beyond High School
9 (28.1%)	Two-year college (AA/AS) degree
0 (0.0%)	Baccalaureate (BA/BS) degree
0 (0.0%)	Masters (MA/MS) degree
4 (12.5%)	Other

(Percentages do not sum to 100 since some employers did not respond to this question.)

The basic skills needed by an employee entering this occupation was consistent with the educational level: high school level reading and writing, and advanced algebra (see table below).

Basic skills needed by an employee entering this occupation:

Reading:	High School level	19	(59.4%)
	College level	9	(28.1%)
Writing:	High School level	19	(59.4%)
	College level	9	(28.1%)
Mathematics:	Arithmetic	8	(25.0%)
	Algebra	4	(12.5%)
	Advanced Algebra	10	(31.3%)
	Statistics	0	(0.0%)
	Other	4	(12.5%)
	Other basic skills	11	(34.4%)

(Percentages do not add to 100 since some employers did not respond to this question.)

While employers generally reported that their electronics technicians were adequately prepared in the skills listed below, they cited technical writing and business writing as the weakest skills (see below).

Are the present employees adequately prepared in the following skills?

	- - YES - -		- - NO - -	
Reading	29	90.6%	1	3.1%
Business Writing	20	62.5%	8	25.0%
Technical Writing	19	59.4%	10	31.3%
Oral Communications	28	87.5%	2	6.3%
Mathematics	30	93.8%	0	0.0%
Technical Skills	29	90.6%	1	3.1%
Management/Supervision	22	68.8%	7	21.9%
Human Relations	25	78.1%	4	12.5%

(Percentages may not add to 100 since some employers did not respond to this question.)

The following table shows which specific technical skills are most frequently required of electronics technicians:

The following skills were required of Electronics Technicians:

27	(84.4%)	AC/DC Circuits
26	(81.3%)	Linear Circuits (transistors, FETs)
22	(68.8%)	Digital Circuits (gates, truth tables)
12	(37.5%)	AM Modulation
15	(46.9%)	FM Modulation
9	(28.1%)	Single Sideband Modulation
27	(84.4%)	Volt/Ohm Meter \
27	(84.4%)	Oscilloscope \ Test Equipment
19	(59.4%)	Bridge Circuits > &
11	(34.4%)	Spectrum Analyzer / Troubleshooting
5	(15.6%)	Other /
12	(37.5%)	Calibration/Instrumentation Techniques
2	(6.3%)	Lasers
1	(3.1%)	Fiber Optics
7	(21.9%)	Technical Writing
19	(59.4%)	Knowledge of Microprocessors
5	(15.6%)	Other Specialized Skills

(Percentages do not sum to 100 since employers could list as many skills as they wished.)

Eight of the employers who responded to this survey (25%) reported that they anticipate new developments that will affect the training needed by electronics technicians. Seven employers indicated that they would be interested in developing a cooperative training program for this occupation, and of those, several indicated a willingness to provide either facilities, equipment, or personnel.

Electronics Mechanic

Twenty-three Sacramento area employers completed the electronics mechanic survey. The responding employers includes CableData, Capital Telephone, Advanced Data Institute, Sierratronics, McClellan, KVIE-TV, NCR Corporation, and Burroughs Corporation. Employers responding to the survey indicated they employed 988 electronics mechanics and expected 222 positions to open in this field over the next two years. Five employers reported having formal training programs for this occupation, while eleven reported having upward mobility training for electronics mechanics. A number of employers commented on the survey that they consider electronics mechanics to be the same type of employee as an electronic technician, and several completed only the electronics technician survey for that reason.

The great majority of employers (65.2%) required technical training beyond high school as the minimum educational level for electronics mechanics, while 13% preferred the two-year college degree (see table below).

Minimum education required:

2 (8.7%)	High School Diploma
15 (65.2%)	Technical training beyond High School
3 (13.0%)	Two-year college (AA/AS) degree
0 (0.0%)	Baccalaureate (BA/BS) degree
0 (0.0%)	Masters (MA/MS) degree
3 (13.0%)	Other

The level of basic skills needed by an employee entering the electronics mechanic occupation was generally consistent with the educational level required -- high school reading, writing and arithmetic -- although 13% of the employers listed advanced algebra as a required basic skill (see below).

Basic skills needed by an employee entering this occupation:

Reading:	High School level	17	(73.9%)
	College level	6	(26.1%)
Writing:	High School level	17	(73.9%)
	College level	6	(26.1%)
Mathematics:	Arithmetic	14	(60.9%)
	Algebra	1	(4.3%)
	Advanced Algebra	3	(13.0%)
	Statistics	1	(4.3%)
	Other	2	(8.7%)
	Other basic skills	13	(56.5%)

(Percentages may not add to 100 since some employers did not answer all parts of this question.)

While employers generally felt their electronics mechanics were adequately prepared in the skills listed in the table below, management/supervision was cited as the weakest area.

Are the present employees adequately prepared in the following skills?

	- - YES - -		- - NO - -	
Reading	22	95.7%	1	4.3%
Business Writing	17	73.9%	6	26.1%
Technical Writing	15	65.2%	6	26.1%
Oral Communications	23	100.0%	0	0.0%
Mathematics	22	95.7%	1	4.3%
Technical Skills	19	82.6%	4	17.4%
Management/Supervision	14	60.9%	7	30.4%
Human Relations	18	78.3%	4	17.4%

(Percentages may not add to 100 since some employers did not respond to all parts of this question.)

The table below indicates which specific technical skills were most often required of electronics mechanics by employers.

The following skills were required of Electronics Mechanics:

21	(91.3%)	Soldering - Iron
11	(47.8%)	Soldering - Vacuum
5	(21.7%)	Soldering - Other types
21	(91.3%)	Identification of Electronic Components
19	(82.6%)	Use of Volt/Ohm Meter
21	(91.3%)	Use of Hand Tools (pliers, cutters, strippers, soldering aids, etc.)
13	(56.5%)	Cable Wrapping
15	(65.2%)	Wire Wrapping on Circuit Boards

(Percentages do not sum to 100 since employers could list as many skills as they wished.)

Five of the employers responding to this survey anticipate new developments that could affect the training needed by electronic mechanics. Five employers indicated they would be interested in developing a cooperative training program with Los Rios for this occupation. The majority of those employers also indicated a willingness to provide facilities, equipment or personnel for such a program.

NEXT STEPS IN RETNA DEVELOPMENT

At this point the RETNA project provides a prototype of a comprehensive data base that could be developed with additional surveys in a wide variety of occupational areas. In order to do the additional survey research -- with the full complement of advisory committees for survey development, staff time to do telephone follow-up with employers, and the requisite hardware (a hard disk drive) for data processing and analysis -- the district will need to find additional funding for the RETNA project. There are several possible alternatives.

RETNA was originally conceived as a cooperative project with business, local education institutions, and the Employment Development Department all sharing in project development costs. While EDD did contribute staff and computer time in the initial stages of RETNA's development, the RETNA project is now at a stage in which the involvement of additional businesses and educational institutions would be most helpful. Toward this end, the district is bringing together a business/education committee that, as one function, will provide a general oversight and direction for the RETNA project. Los Rios will also encourage increased involvement (even including some staff and computer time) from EDD and local educational institutions that would like to have the RETNA data base for their own use. The cooperative development approach would not only spread the future costs of RETNA's development among more participants, but would also ensure that RETNA is designed to serve as many different users as possible.

In addition to its uses for vocational program development and improvement, RETNA also offers a current data base that could be used by the regional private industry councils (three PICs are operating in the four-county Sacramento metropolitan area) to identify those occupations which offer the greatest potential employment. Since the State through the Job Training Partnership Act (JTPA) is currently allocating millions of dollars for job training to the private industry councils (who in turn allocate funds to local training entities), the existence of a comprehensive local data base that can identify not only occupations with good employment potential but also the specific basic and technical skills required in each occupation should be of considerable value. The difficulties in using EDD's employment data for local labor market purposes has been alluded to earlier. However, a recent study prepared for the Los Angeles Business Labor Council underscores the problems we found with using the EDD data:

> Most notably, [EDD's] occupational projections are computed on the basis of decennial census data which is dangerously outdated by the time it is processed and utilized. Additionally, the techniques of trend extrapolations used in these projections make them relatively insensitive to rapid economic and employment shifts. Finally, these projections provide no information about the skill requirement of occupations.
>
> (Labor Demand Forecasting for Los Angeles: Can Existing Systems Be Improved?, Fred J. Best and Sherry M. Bell, Pacific Management Research Associates, September 1983, page vii)

The district is currently exploring the possibility of funding some portion of the future development of RETNA through JTPA funds, since the RETNA data base could provide information for three different private industry councils in this region.

Finally, there is a bill in the Legislature (AB 2076) that would fund RETNA-type projects "to determine the current and long-run employment needs in specific industries and occupations in local service delivery areas." The bill, if enacted and funded, would establish the Community College Training Improvement Program to be administered by the State Community College Chancellor's Office. The bill would authorize the chancellor to fund eligible community college districts meeting specified criteria for the planning, implementation, and evaluation of exemplary programs. Pilot projects would be undertaken "in cooperation with the Employment Development Department and the private industry council of the respective areas of the local district, and the information will be made available to all local employment and training agencies." District staff worked with legislative staff and the California Association of Community Colleges in the development of the bill. The bill is authored by Assemblymen Farr, Clute, Hauser, and Hayden and enjoys the support of a number of community college groups. Whether the bill will continue as currently written and be passed and funded remains to be seen. However, district staff will continue to be involved in working with the various organizations and legislative committees toward the establishment of a pilot program that could fund projects for local labor market information development in district throughout California.

APPENDIX A

RETNA Description

Employer Letter

Initial RETNA Surveys

LOS RIOS COMMUNITY COLLEGE DISTRICT

Sacramento City College 1916 — American River College 1955 — Cosumnes River College 1970

DAVID MERTES
Chancellor/Superintendent

A PARTNERSHIP FOR EMPLOYMENT: THE RETNA PROJECT

With the incentives of a changing employment market and a continuing high unemployment rate in the Sacramento area, a coalition of Sacramento area business, industry, labor and educational leaders are developing a sophisticated plan to link workers with available jobs and new training opportunities.

The Regional Employment and Training Needs Assessment (RETNA) project was organized in late 1982 to link the employment requirements of business, industry and the public sector with the education and training capabilities of the Los Rios Community College District and other local educational institutions. The RETNA model features a steering committee composed of representatives of private and public sector employers, community development groups, organized labor and education throughout the Sacramento region. The purpose of the RETNA project is to determine the current and long-range employment needs in specific industries and occupations and then to meet those needs through the various delivery capabilities of the local colleges.

The RETNA project involves the development of a computer model based on employer surveys to assess employment demand and training needs. Representatives of business, industry and government will assist in the survey design. The first surveys--covering two occupations in the computer industry and two in the electronics industry--will be sent shortly to employers identified by the Employment Development Department (EDD) from their data base. Employers currently planning to locate in the Sacramento area will also be surveyed. In addition to identifying short- and long-range employment needs, the surveys will furnish data on the specific qualifications and training needed by employees in the various occupations. The members of RETNA will use the information generated: 1) to provide training opportunities consistent with present and future employment needs; 2) to provide employment market coordination between labor, private employers and training agencies; and 3) to recruit new employers into the service area. In addition, the RETNA information will be used by the Los Rios District to develop training programs to meet the needs of specific industries and employers through such means as on-site training or contract education, to upgrade current vocational programs, and to identify areas in which new programs are needed. The surveys will be done on various occupations on a periodic basis so as to provide continuous updating of the information. Working with such a model--and with the wide variety of organizations who are partners in the RETNA project--ensures that training programs can be developed in a highly coordinated and cost-effective manner, benefitting both employers and workers.

1919 SPANOS COURT • SACRAMENTO, CALIFORNIA 95825 • (916) 920-7821

LOS RIOS COMMUNITY COLLEGE DISTRICT

Sacramento City College 1916 — American River College 1955 — Cosumnes River College 1970

DAVID MERTES
Chancellor/Superintendent

October 7, 1983

Dear Employer:

I am writing you about a new project that is important to your company and to our community, the Regional Employment and Training Needs Assessment (RETNA) project. The RETNA project was organized in late 1982 to determine both current and projected employment needs in specific industries and occupations in the Sacramento region and then to meet those needs through the training capabilities of the Los Rios Community College District. The project enjoys the support of organizations such as SACTO and employers like Computer Sciences Corporation and McClellan Air Force Base.

The RETNA project involves the development of a computerized data base developed from employer surveys. The first surveys--covering two occupations in the computer industry and two in the electronics industry--are being sent to certain employers in the Sacramento region as well as to firms planning to locate in this area. The information in the RETNA data base will be unique and will be used by area training organizations to: (1) develop training programs to meet the specific needs of individual employers through such means as on-site training or contract education; (2) upgrade current vocational programs; and (3) identify areas in which new programs are needed.

Please take the time to fill out the enclosed surveys. The quality of the RETNA data base is absolutely dependent on the kind and amount of information you provide.

Please send your completed surveys by October 21, 1983 to:

Janis Cox Coffey
Director of Education and Planning
Los Rios Community College District
1919 Spanos Court
Sacramento, CA 95825

If you have questions, please feel free to call Ms. Coffey at 920-7891. Thank you for your cooperation.

Sincerely,

David Mertes

David Mertes
Chancellor/Superintendent

1919 SPANOS COURT • SACRAMENTO, CALIFORNIA 95825 • (916) 920-7821

GENERAL EMPLOYER SURVEY

COMPANY: _____ ADDRESS: _____

CITY: _____ COUNTY: _____ STATE: _____ ZIP: _____

NAME: _____ POSITION: _____

PHONE: ( ) _____

MAJOR PRODUCT OR SERVICE: _____

NUMBER OF EMPLOYEES (SACTO. AREA): _____

(1) Please indicate the number of employees in your organization (in Sacto. area) in each category below, and indicate the estimated number of new hires you anticipate in each category over the **next two years** due to turnover or new (additional) positions.

	Number Presently Employed	Number of Hires Due To Turnover	Number of Hires Due To New Positions
Mgmt/Admin.	_____	_____	_____
Supervisory	_____	_____	_____
Sales/Marketing	_____	_____	_____
Technical	_____	_____	_____
Clerical	_____	_____	_____
Production	_____	_____	_____
Other Categories:			
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(2) Please check ( ) the **recruitment sources you use to fill** positions.

_____ Private employment agencies
_____ State Employment Development Department
_____ Colleges or technical school placement offices
_____ Newspaper ads
_____ Employee referrals
_____ Professional publications
_____ Other (Please specify: _____)

(3) Do you currently conduct a training program for employees? Check which apply.

_____ Yes
_____ Yes, for all staff
_____ Yes, but **only for** new staff
_____ No, but **would** like to develop one
_____ No

(4) Would you be interested in working with the Los Rios District colleges to design a training program to meet your needs?

_____ Yes _____ No

-over-

(5) If yes, in which of the following areas?

_____ Basic Education Skills (reading, writing, basic math)
_____ Business Writing
_____ Technical Writing
_____ Oral Communications
_____ Data Processing--Computer Literacy (Mini and Micro Computers)
_____ Data Processing--Computer Operations
_____ Computer Programming
_____ Electronics--Production
_____ Electronics--Technician (Specify type: _____)
_____ Electronics--Repair
_____ Electronics--Digital
_____ Opto Electronics
_____ Accounting/Finance
_____ Engineering--Technician (Specify type: _____)
_____ Human Relations
_____ Management Skills
_____ Mathematics/Statistics
_____ Sales and Marketing
_____ Word Processing
_____ Secretarial Skills
_____ Other (Please specify: _____)

(6) What is the best site for instruction/training?

_____ At your site
_____ At a site close to your organization
_____ At a college campus

(7) Should instruction/training be offered for:

_____ College credit
_____ Credit plus certificate of completion
_____ Certificate of completion only

(8) What are the best times to schedule training for your employees?

_____ Morning
_____ Afternoon
_____ Evening
_____ Weekend
_____ Combination of above

(9) What types of incentives could you offer for employees to take further training?

_____ Release time from work
_____ "Flextime" schedule
_____ Company payment of tuition, books, etc.
_____ Possibility of subsequent promotion
_____ Other (Specify: _____)
_____ None

(10) Additional Comments?

_____
_____
_____

Thank you!

JCC:lb
7/7/83

COMPANY: _____
NAME: _____
POSITION: _____

O C C U P A T I O N A L S U R V E Y

COMPUTER PROGRAMMER

(1) How many computer programmers do you currently employ in your organization? ____

(2) What is the approximate annual rate of turnover? _____ %

(3) How many people do you expect to hire in this occupation over the next two years? _____

(4) Do you have a formal training program for entry into this occupation?

_____ Yes _____ No

(5) Do you provide upward mobility training for the next level of occupation in the career ladder?

_____ Yes _____ No

(6) What is the minimum educational level that you require for this occupation?

_____ High School Diploma
_____ Technical Training Beyond High School
_____ Two-Year College AA/AS Degree
_____ Baccalaureate (BA/BS) Degree
_____ Masters (MA/MS) Degree
_____ Other (Please specify: _____)

(7) What basic skills are needed by an employee for entry into this occupation:

Reading:	High School Level	____	College Level	____
Writing:	High School Level	____	College Level	____
Mathematics:	Arithmetic	____	Algebra	____
	Advanced Algebra	____	Statistics	____
	Other Math ____	(Please specify: _____)		

Other Basic Skills: _____ (Please specify: _____)

(8) Are your present employees in this occupation adequately prepared in the following skills?

	Yes	No
Reading	____	____
Business Writing	____	____
Technical Writing	____	____
Oral Communication	____	____
Mathematics	____	____
Technical Skills	____	____
Management/Supervision	____	____
Human Relations	____	____

(9) What computer languages should an employee in this occupation know?

BASIC ____ COBOL ____ FORTRAN ____ RPG ____ ASSEMBLY ____ PASCAL ____
PL1 ____ ADA ____
OTHER ____ (Please specify _____)

	Large Mainframe Computer	Mini-Computer	Micro-Computer
(10) Which type of computer system do you currently use?	_____	_____	_____
Which of these do you anticipate acquiring?	_____	_____	_____
In which of these do your employees need training?	_____	_____	_____

(11) Which of the following skills do you require of employees in this occupation?

_____ Flowcharting
_____ I/O Operations
_____ Arithmetic Operations
_____ Editing
_____ Tape/Disk Operations
_____ Table Handling
_____ File Access
_____ File Design/Organization
_____ System Flowcharting
_____ Systems Analysis
_____ Other (Please specify: _____)

(12) Which of the following systems/processes should employees in this occupation know?

_____ Batch/Time-Sharing Systems
_____ Data Communication Systems
_____ Documentation
_____ Graphics
_____ Program Debugging Techniques
_____ Data Base Management
_____ File Management
_____ Structural "Walk-Thrus"
_____ Program Testing Techniques
_____ Other (Please specify: _____)

(13) Do you anticipate any new developments that would affect the training needed in this occupation? Yes _____ No _____

If yes, please specify: _____

_____

(14) Would you be interested in a cooperative training program with the area colleges for employees in this occupation?
Yes _____ No _____

(15) If yes, could your firm share in the provision of any of the following for such a program?

Facilities: _____ Equipment: _____ Personnel: _____

(16) If you are interested in such a program, please provide the name and phone number of the most appropriate person in your organization for us to contact:

Name _____

Phone ( ) _____

Thank you!

JCC:lb
7/7/83

COMPANY: _____
NAME: _____
POSITION: _____

O C C U P A T I O N A L S U R V E Y

COMPUTER OPERATOR

(1) How many computer operators do you currently employ in your organization? _____

(2) What is the approximate annual rate of turnover? _____ %

(3) How many people do you expect to hire in this occupation over the next two years? _____

(4) Do you have a formal training program for entry into this occupation?

_____ Yes _____ No

(5) Do you provide upward mobility training for the next level of occupation in the career ladder?

_____ Yes _____ No

(6) What is the minimum educational level that you require for this occupation?

_____ High School Diploma
_____ Technical Training Beyond High School
_____ Two-Year College AA/AS Degree
_____ Baccalaureate (BA/BS) Degree
_____ Other (Please specify: _____)

(7) What basic skills are needed by an employee for entry into this occupation:

Reading:	High School Level	_____	College Level	_____
Writing:	High School Level	_____	College Level	_____
Mathematics:	Arithmetic	_____	Algebra	_____
	Advanced Algebra	_____	Statistics	_____
	Other Math	_____	(Please specify _____)	
Other Basic Skills:		_____	(Please specify: _____)	

(8) Are your present employees in this occupation adequately prepared in the following skills?

	Yes	No
Reading	_____	_____
Business Writing	_____	_____
Technical Writing	_____	_____
Oral Communication	_____	_____
Mathematics	_____	_____
Technical Skills	_____	_____
Management/Supervision	_____	_____
Human Relations	_____	_____

-over-

(9) Which of the following skills do you require of employees in this occupation?

_____ Basic Computer Terminology
_____ Knowledge of Storage Media/Devices
_____ Data Collection/Transmission Procedures
_____ I/O Techniques
_____ Computer Operations
_____ Programming Techniques
_____ Other (Please specify: _____)

(10) Which of the following systems/processes should employees in this occupation know?

_____ Batch/Time-Sharing Systems
_____ Data Communication Systems
_____ Documentation
_____ Graphics
_____ Program Debugging Techniques
_____ Data Base Management
_____ File Management
_____ Structural "Walk-Thrus"
_____ Program Testing Techniques
_____ Other (Please specify: _____)

	Large Mainframe Computer	Mini-Computer	Micro-Computer
(11) Which type of computer system do you currently use?	_____	_____	_____
Which of these do you anticipate acquiring?	_____	_____	_____
In which of these do your employees need training?	_____	_____	_____

(12) Do you anticipate any new developments that would affect the training needed in this occupation? Yes _____ No _____

If yes, please specify: _____
_____

(13) Would you be interested in a cooperative training program with the area colleges for employees in this occupation?
Yes _____ No _____

(14) If yes, could your firm share in the provision of any of the following for such a program?

Facilities: _____ Equipment: _____ Personnel: _____

(15) If you are interested in such a program, please provide the name and phone number of the most appropriate person in your organization for us to contact:

Name _____

Phone ( ) _____

Thank you!

JCC:lb
7/7/83

COMPANY: _____
NAME: _____
POSITION: _____

O C C U P A T I O N A L S U R V E Y

ELECTRONICS TECHNICIAN

(1) How many electronics technicians do you currently employ in your organization? ___

(2) What is the approximate annual rate of turnover? _____ %

(3) How many people do you expect to hire in this occupation over the next two years? _____

(4) Do you have a formal training program for entry into this occupation?

_____ Yes _____ No

(5) Do you provide upward mobility training for the next level of occupation in the career ladder?

_____ Yes _____ No

(6) What is the minimum educational level that you require for this occupation?

_____ High School Diploma
_____ Technical Training Beyond High School
_____ Two-Year College AA/AS Degree
_____ Baccalaureate (BA/BS) Degree
_____ Other (Please specify: _____)

(7) What basic skills are needed by an employee for entry into this occupation:

Reading:	High School Level	_____	College Level	_____
Writing:	High School Level	_____	College Level	_____
Mathematics:	Arithmetic	_____	Algebra	_____
	Advanced Algebra	_____	Statistics	_____
	Other Math _____	(Please specify: _____)		
Other Basic Skills: _____	(Please specify: _____)			

(8) Are your present employees in this occupation adequately prepared in the following skills?

	Yes	No
Reading	_____	_____
Business Writing	_____	_____
Technicial Writing	_____	_____
Oral Communication	_____	_____
Mathematics	_____	_____
Technical Skills	_____	_____
Management/Supervision	_____	_____
Human Relations	_____	_____

-over-

) Which of the following skills do you require of employees in this occupation?

_____ AC/DC Circuits
_____ Linear Circuits (transistors, I.C. amps, FETs)
_____ Digital Circuits (gates, truth tables)
_____ Receiver/Transmitter Modulations:
  _____ AM
  _____ FM
  _____ Single Side Band
_____ Test Equipment/Trouble Shooting:
  _____ Volt/Ohm Meter
  _____ Oscilloscope
  _____ Bridge Circuits
  _____ Spectrum Analyzer
  _____ Other (Please specify: _____)
_____ Calibration/Instrumentation Techniques
_____ Lasers
_____ Fiber Optics
_____ Technical Writing
_____ Knowledge of Microprocessors
_____ Other Specialized Skills (Please specify: _____
_____)
_____)

10) Do you anticipate any new developments that would affect the training needed in this occupation? Yes _____ No _____

If yes, please specify: _____
_____

11) Would you be interested in a cooperative training program with the area colleges for employees in this occupation?
Yes _____ No _____

12) If yes, could your firm share in the provision of any of the following for such a program?

Facilities: _____ Equipment: _____ Personnel: _____

13) If you are interested in such a program, please provide the name and phone number of the most appropriate person in your organization for us to contact:

Name _____

Phone ( ) _____

Thank you!

CC:lb
/18/83

COMPANY: _____
NAME: _____
POSITION: _____

O C C U P A T I O N A L S U R V E Y

ELECTRONICS MECHANIC

(1) How many electronics mechanics do you currently employ in your organization? _____

(2) What is the approximate annual rate of turnover? _____ %

(3) How many people do you expect to hire in this occupation over the next two years? _____

(4) Do you have a formal training program for entry into this occupation?

_____ Yes _____ No

(5) Do you provide upward mobility training for the next level of occupation in the career ladder?

_____ Yes _____ No

(6) What is the minimum educational level that you require for this occupation?

_____ High School Diploma
_____ Technical Training Beyond High School
_____ Two-Year College AA/AS Degree
_____ Baccalaureate (BA/BS) Degree
_____ Other (Please specify: _____)

(7) What basic skills are needed by an employee for entry into this occupation:

Reading:	High School Level	_____	College Level	_____
Writing:	High School Level	_____	College Level	_____
Mathematics:	Arithmetic	_____	Algebra	_____
	Advanced Algebra	_____	Statistics	_____
	Other Math _____	(Please specify: _____)		
Other Basic Skills: _____	(Please specify: _____)			

(8) Are your present employees in this occupation adequately prepared in the following skills?

	Yes	No
Reading	_____	_____
Business Writing	_____	_____
Technical Writing	_____	_____
Oral Communication	_____	_____
Mathematics	_____	_____
Technical Skills	_____	_____
Management/Supervision	_____	_____
Human Relations	_____	_____

-over-

(9) Which of the following skills do you require of employees in this occupation?

_____ Soldering--Iron
_____ Soldering--Vacuum
_____ Other Types Soldering (Please specify: _____)
_____ Identification of Electronic Components
_____ Use of Volt/Ohm Meter
_____ Use of Hand Tools (such as pliers, cutters, strippers, soldering aids, etc.)
_____ Cable Wrapping
_____ Wire Wrapping on Circuit Boards

(10) Do you anticipate any new developments that would affect the training needed in this occupation? Yes _____ No _____

If yes, please specify: _____
_____

(11) Would you be interested in a cooperative training program with the area colleges for employees in this occupation?
Yes _____ No _____

(12) If yes, could your firm share in the provision of any of the following for such a program?

Facilities: _____ Equipment: _____ Personnel: _____

(13) If you are interested in such a program, please provide the name and phone number of the most appropriate person in your organization for us to contact:

Name _____

Phone ( ) _____

Thank you!

JCC:1b
4/18/83

APPENDIX B

RETNA Computer Program Technical Summary

RETNA:

Regional Employment and Training

Needs Assessment Project

Computer Program Technical Summary

Randall D. Jones
Senior Systems Programmer
Los Rios Community College District

January, 1984

RETNA

COMPUTER PROGRAM

TECHNICAL SUMMARY

This Summary describes the Regional Employment and Training Needs Assessment (RETNA) project's interactive computer prototype and its operating environment, to give a technically-oriented person an understanding of its structure and function.

COMPUTER SYSTEM HARDWARE

The RETNA interactive prototype runs on an enhanced Apple II+ computer system. The additions to the basic Apple 48K computer system are packaged by Microsoft as the Softcard Premium Package and consist of a Zilog Z80 microprocessor card, a 16K RAM card (upgrading the system to 64K bytes of main memory), and a video driver card which generates a 24-line by 80-column CRT display. System peripherals include three Apple 5-1/4" diskette (floppy disk) drives, which hold 128K bytes each, and an Apple Super Serial Card to drive a printer.

COMPUTER SYSTEM SOFTWARE

The operating system, which is included with the Softcard Premium Package, is Digital Research's CP/M-80. It was chosen for its low processor time and disk storage overhead, and overwhelming popularity with and availability for the vast majority of personal computers before the era of "IBM PC compatibility". The data base management system is Ashton-Tate's dBASE II. It is also a an industry leader, and versions of dBASE II are available for most all computer systems, allowing for great portability of the prototype to systems other than the Apple II+.

USE OF DISK STORAGE

The files containing the dBASE II software occupy virtually all of the space on the first of the three diskette drives. Only two small "root" command files share this drive, one for the data base maintenance system, and one for the interactive query system.

The dBASE II command files which comprise the RETNA system reside on two separate diskettes. One of these two diskettes resides in the second of the three diskette drives at any one time. The first diskette contains the command files for the data base maintenance system. The maintenance system provides three

main functions: 1) data entry and editing, 2) data base summary processing necessary after any entry or editing, and 3) reporting used to obtain employer code and job title code listings. The second diskette contains the command files for the the interactive data base query system.

The third of the three diskette drives on the system holds the files which comprise the RETNA data base. There are three general categories of files in the data base: 1) those containing employer data, 2) those containing occupational data, and 3) cross-reference files linking employer survey data to the associated occupational survey data. The employer titles file (containing company names) can, with reasonable effort by a dBASE II programmer, be completely removed from the system in situations where employer anonymity is desirable or required.

DATA ENTRY AND EDITING

The data entry and editing system is the first phase of the maintenance system. It allows the user to: 1) enter new employer or occupational data, or 2) edit information currently on file. Deletion of information from the data base is not a part of this system, but may be done "by hand" by a person knowledgeable in dBASE II programming with minimal effort. To ease use by clerical personnel who might be unfamiliar with the surveys or computer data entry, all data entry/edit screens have been formatted to appear as similar as possible to the actual survey forms and prompt the operator for responses when possible. The data from a general employer survey must be entered before the system will accept entry of any occupational survey data for that employer number.

SUMMARY PROCESSING

There are three summary processing runs listed on the maintenance system menu. The first is employer summary processing. It must be run after any data entry or editing has taken place on the employer data files. The second is the occupational summary run, which must be done after any changes to the occupational data. The third summary run is called the cross-reference run. It builds links between an employer's general survey information and the occupational surveys to which that employer responded. The cross-reference run must be done after any additions or deletions have been made to either the employer data files or the occupational data files. If only editing has been done, this run is not required, since editing does not affect the number of surveys present on the files, only their content. Running any or all of these without having done any entry or editing is not harmful, and is one method of assuring that the data base files are "synchronized" with each other.

REPORTING

The RETNA prototype was designed entirely as an interactive system, and most all information contained in the RETNA data base is available on screens which offer the user the option of printing a copy of the current screen. There are some screens, however, which do not offer the user the print option. These are the menu screens, and the lists of code numbers by which the data is accessed. As a result, the maintenance system offers four "hard-copy" reports: 1) occupation titles in occupation code order, 2) occupation titles in alphabetical order, 3) employer names in employer code order, and 4) employer names in alphabetical order. These reports are offered as reference lists to be used as aids to using the interactive system. As an example, if a user knows a specific company's name, they could locate that company's code number on the report and enter it on the menu screen without having to search the long online list, which is only available in employer code number order.

QUERY SYSTEM

The interactive portion of the RETNA system is designed to be a menu-driven system, prompting the user with all possible choices at any point in the program. The screens are formatted to resemble the sections of the survey forms for which they are reporting the results.

There are two primary "paths" or "tracks" the user may follow from the main menu. The first path offers a stroll through any of the occupational survey summaries, listed by occupation code. The second path offers a look at the employer data, either for a specific employer or the summary results for all employers. When a specific employer's survey answers are requested, all answers from the general employer survey are shown, followed by a listing of the occupational surveys to which that employer responded. The user can then look at that specific employer's responses to those occupational surveys. A schematic diagram of the screen tracks and their relationships is included at the end of this Summary.

As mentioned previously, each screen notifies the user of the possible responses, allowing them to proceed in an orderly fashion through the screen tracks. The usual options available at any of the information screens are: 1) hitting the space bar, which causes the system to present the next screen in the track, 2) the letter "P", which allows a print-out of that screen, and 3) the letter "S", which causes the system to skip the remaining screens in the track, proceeding directly to the next menu.

EXPANSION OF THE DATA BASE

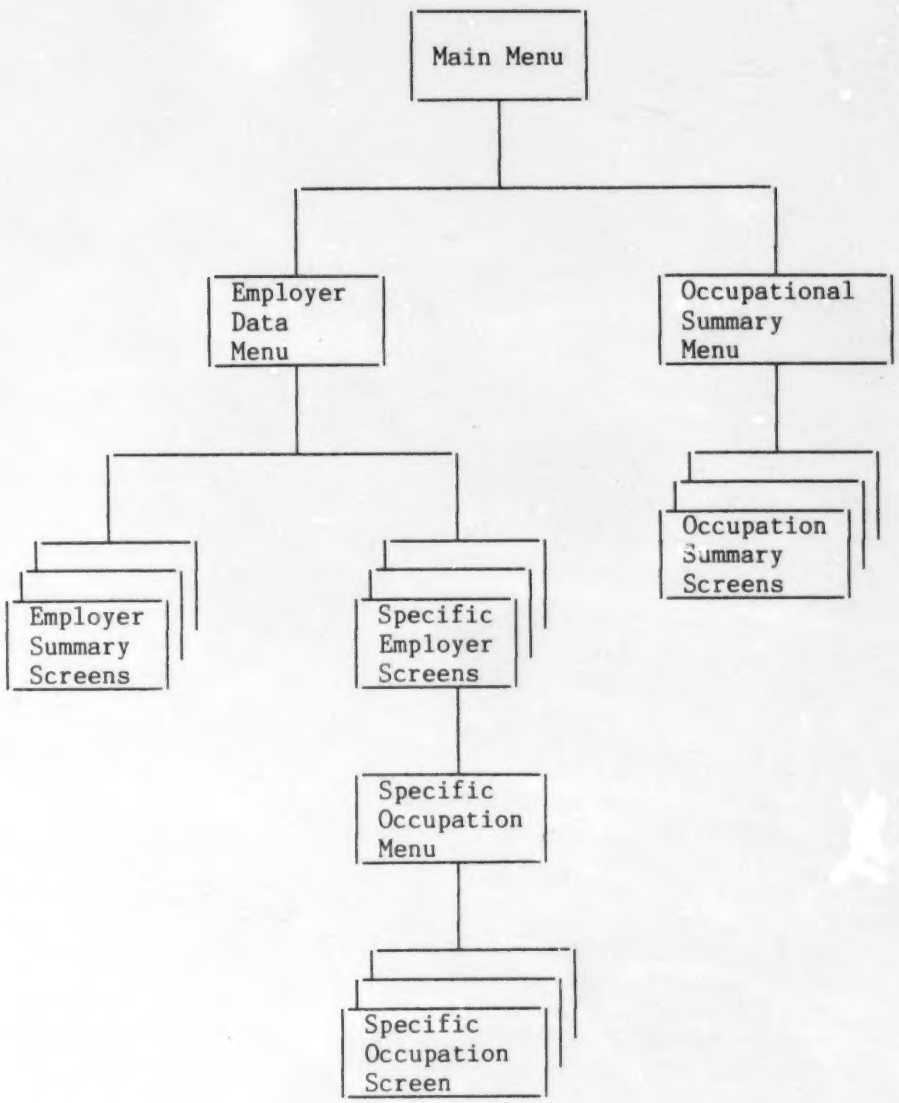
The addition of data for new employers is a simple matter, involving use of the previously-mentioned maintenance facility to do data entry, summary processing, and optional production of new "hard-copy" code reports. The RETNA prototype system, with some 115 general employer surveys and 150 occupational surveys,

still has room on the data base diskette for the addition of more surveys for the occupations currently supported. The addition of support for surveys for new occupation titles must be done by a dBASE II programmer. Several steps are required to allow for a new survey format: 1) the creation of two data base files, 2) additional coding in the maintenance system to allow for entry of the data from the survey form, 3) new coding in the summary processing area, and 4) new coding of screens in the interactive system to allow for the display of the new survey results. This would likely require more room than is available on the three-drive Apple in use for the prototype.

FUTURE OF THE PROTOTYPE

As the RETNA data base grows in size and scope, it is expected that the interactive query system will be updated to allow easier access to the current information, and include presentation of some new information based on the suggestions of those using the prototype. It is already known that the current screen tracks do not allow convenient access to certain areas, and that some summary data should be presented for comparison with specific survey responses. Speed of access could be enhanced by replacing the slow diskette drives on the computer system with a Winchester technology "hard disk" drive. This would also greatly increase the capacity of the system, not only having more room for data, but also having the space to house the new dBASE II command files to allow access to the data by the user.

Schematic Diagram of the RETNA Interactive System



Computer Operating Instructions for the RETNA System

(These instructions are for the prototype system: an Apple II+ computer with three diskette drives attached, a BMC video monitor, and a Diablo 630 daisy-wheel printer.)

1) Turn on the power switches in the following order:
   a) the Apple system unit (switch on the left rear corner),
   b) the monitor (top switch is on the right side), and
   c) the printer (switch on right rear corner near top).

2) Insert the diskettes in the following order:
   a) in drive A:, the "DB2" diskette,
   b) in drive B:, the "DAT" diskette, and
   c) in drive C:, the "CMD" diskette for interactive query, or
      the "MAI" diskette for maintenance.

3) The system will use the diskette in drive A: as soon as the door is closed. CP/M will be loaded and will show its readiness with the prompt "A>".

4) Type the command "DBASE RETNA" for interactive query, or
   "DBASE MAINT" for maintenance.

5) The system will check to see if you have placed the proper diskettes in the proper drives, and if all is OK, the first screen will appear.

At this point, operation of the system is menu-driven. When you are done using the system and wish to turn the system off:

1) Open the doors on all three diskette drives, remove the diskettes, and return them to the protective jackets. If you are using the maintenance system, DO NOT do this until the main menu is showing on the screen.

2) Turn off the power switches:
   a) first the printer,
   b) then the monitor,
   c) then the Apple system unit.

APPENDIX C

Members of RETNA Advisory Committee

RETNA Advisory Committee

Robert Allerton, Dean, Occupational Education - CRC

Janis Coffey, Director, Education & Planning - D.O. - Chair

Carrie Douglas, Associate Dean, Instruction - ARC

Randall Jones, Senior Systems Programmer, Data Processing - D.O.

Beth Lee, Faculty Research Associate - D.O.

Pat O'Brien, Associate Dean, Occupational Education - ARC

Nancy Renkiewicz, Associate Dean, Community Education - SCC

Sharon Ruckle, Assistant Dean, Research & Development - ARC

Paul Steed, Director, Data Processing - D.O.

Norval Wellsfry, Associate Dean, Occupational Education/
Administrative Services - SCC

Robert Wyman, Director, Special Projects - D.O.

ERIC CLEARINGHOUSE FOR
JUNIOR COLLEGES
UNIVERSITY OF CALIFORNIA

JUN 1 1984

8118 Math-Sciences Building
Los Angeles, California 90024